COLLEGE OF ENGINEERING, UC BERKELEY

CHESS
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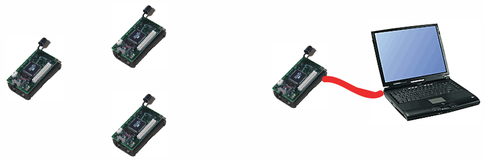
Viptos A Graphical Development and Simulation Environment for TinyOS-Based Wireless Sensor Networks

Motivation

Wireless sensor networks are flexible and easy to deploy...

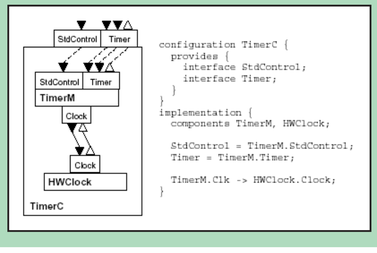


...but they can be difficult to program and debug.

Background

TinyOS is an event-driven, component-based runtime environment for the motes. TOSSIM is an interrupt-level simulator for TinyOS programs. It runs actual TinyOS code but provides software replacements for the simulated hardware and models network interaction at the bit or packet level.

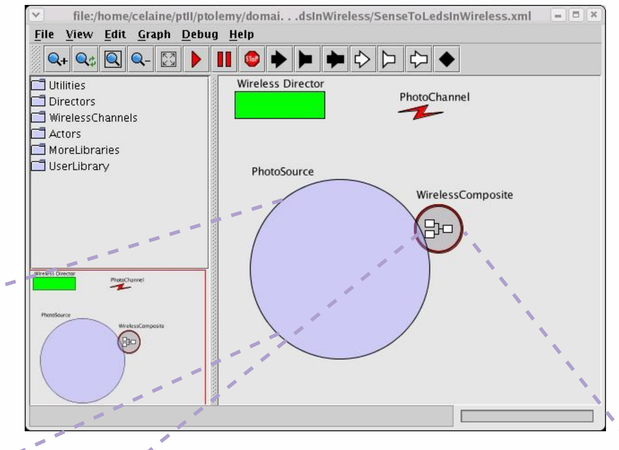
nesC / TinyOS Architecture

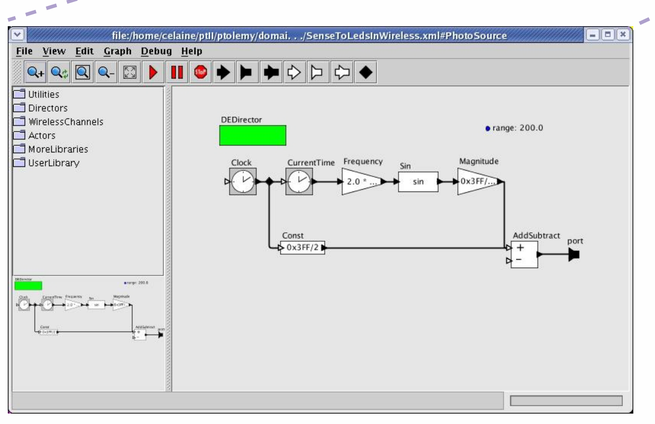


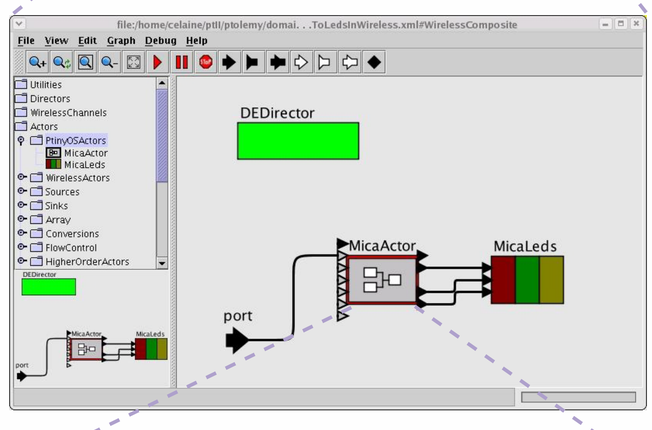
Summary

Viptos (Visual Ptolemy and TinyOS) is an integrated graphical development and simulation environment for TinyOS-based wireless sensor networks. Viptos provides interrupt-level simulation of actual TinyOS programs, with packet-level simulation of the network, while allowing the developer to use other models of computation available in Ptolemy II for modeling various parts of the system.

Example: SenseToLeds








```
configuration MicaActor {
}
implementation {
components Main, TimerC, IntToLeds, SenseToInt, DemoSensorC;
SenseToInt.TimerControl -> TimerC.StdControl;
SenseToInt.Timer -> TimerC.Timer[unique("Timer")];
SenseToInt.IntOutput -> IntToLeds.IntOutput;
Main.StdControl -> IntToLeds.StdControl;
Main.StdControl -> SenseToInt.StdControl;
SenseToInt.ADC -> DemoSensorC.ADC;
SenseToInt.ADCControl -> DemoSensorC.StdControl;
}
```